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Indirect dissociative recombination of water molecule at low electronic energies[1] SAMANTHA FONSECA, NICOLAS DOUGUET, UCDavis, VIATCHESLAV KOKOOULINE, UCF, ANN OREL, UCDavis — We present a theoretical study of the indirect dissociative (DR) recombination of the water molecular ion H_2O^+ at low collisional energies. The approach is based on the computation of the scattering matrix just above the ionization threshold and enables the explicit determination of all diabatic electronic couplings responsible for dissociative recombination. We use the multi-channel quantum- defect theory to demonstrate the precision of the scattering matrix by reproducing accurately ab initio Rydberg state energies of the neutral molecule. We also present our latest results on H_2O^+ with our previous results on the DR of linear molecular ions N_2H^+ and HCO^+ and demonstrate the crucial role of the previously overlooked longitudinal modes for linear polyatomic ions with large permanent dipole moment.

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Samantha Fonseca
UCDavis

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